REMARKS

Claims 1-3, 6-14 and 16-21 are all the claims pending in the application.

I. Claim Rejections

A. Claims 7-10, 12 and 13 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Kawai (JP 01-266966).

Claim 7, as amended, recites that the setting section stores a relationship between a lapse of time from the short circuit and the gradient value of the welding current, and the dip-waveform circuit section sets the gradient value based on the relationship stored in the setting section.

Applicants respectfully submit that Kawai does not disclose or suggest at least the above-noted combination of features recited in claim 7.

With respect to the above-noted feature, Applicants note that in the Office Action, the Examiner has taken the position that the dip pulse control circuit 14 of Kawai corresponds to the claimed "setting section" and the claimed "dip-waveform circuit section" (see Office Action at the top of page 3). In this regard, Applicants note that Kawai discloses that the dip pulse control circuit 14 outputs a pulse synchronization signal V_{tp} and a waveform switching signal V_{F2} (see Fig. 1).

Thus, while the dip pulse control circuit 14 of Kawai outputs a pulse synchronization signal V_{tp} and a waveform switching signal V_{F2}, Applicants submit that the dip pulse control circuit 14 does not store a relationship between a lapse of time from a short circuit and a gradient value of welding current. As such, Applicants submit that the dip pulse control circuit also does

not set a gradient value based on a stored relationship between a lapse of time from a short circuit and a gradient value of welding current.

In view of the foregoing, Applicants respectfully submit that Kawai does not disclose, suggest or otherwise render obvious the above-noted feature recited in amended claim 7 which indicates that the setting section stores a relationship between a lapse of time from the short circuit and the gradient value of the welding current, and the dip-waveform circuit section sets the gradient value based on the relationship stored in the setting section.

Accordingly, Applicants submit that claim 7 is patentable over Kawai, an indication of which is kindly requested.

In addition, Applicants note that claim 7 has also been amended so as to recite that the dip-waveform circuit section sets the welding current to have a gradient smaller than a gradient at a pulse rise of a current waveform of the pulse when the arc short-circuit judging section judges a welding state is in a short-circuit period.

With respect to the above-noted feature, as explained above, the Examiner has taken the position in the Office Action that dip pulse control circuit 14 of Kawai corresponds to the claimed "dip-waveform circuit section" (see Office Action at the top of page 3). As noted above, however, the dip pulse control circuit 14 of Kawai merely outputs a pulse synchronization signal V_{tp} and a waveform switching signal V_{F2} (see Fig. 1).

Thus, while the dip pulse control circuit 14 of Kawai outputs a pulse synchronization signal V_{tp} and a waveform switching signal V_{F2}, Applicants submit that the dip pulse control circuit 14 does not set a welding current to have a gradient smaller than a gradient at a pulse rise of a current waveform of the pulse when an arc short-circuit judging section judges a welding state is in a short-circuit period.

In view of the foregoing, Applicants respectfully submit that Kawai does not disclose, suggest or otherwise render obvious the above-noted feature recited in amended claim 7 which indicates that the dip-waveform circuit section sets the welding current to have a gradient smaller than a gradient at a pulse rise of a current waveform of the pulse when the arc short-circuit judging section judges a welding state is in a short-circuit period.

Accordingly, Applicants submit that claim 7 is patentable over Kawai, an indication of which is kindly requested.

Regarding claims 8-10, 12 and 13, Applicants note that these claims depend from claim 7 and are therefore considered patentable at least by virtue of their dependency.

B. Claims 1-3, 6 and 14-16 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Stava (US 6,501,049) in view of Oku (US 3,376,473).

Claim 1, as amended, recites the feature of storing a relationship between a lapse of time from a short circuit of the welding wire and the welding base material and a gradient of the welding current, the gradient being smaller than a gradient at a pulse rise of a current waveform of the pulse.

Applicants respectfully submit that the combination of Stava and Oku does not teach or suggest at least the above-noted feature recited in amended claim 1.

Regarding Stava, Applicants note that this reference discloses a short circuit welding process including a short condition 10, an arc condition 12, tailout 14, and background 16 (see Fig. 1 and col. 4, lines 25-27). In this regard, as described in Stava with reference to Fig. 1, at time 30, metal is transferred from an electrode to a workpiece by surface tension action, with this action being accelerated by pinch pulse 32 that is used to control the current with a profile

having a rapidly increasing current section 32a, a breakpoint 32b to give a second slope, and a premonition point 32c (see col. 4, lines 35-41).

Based on the foregoing, Applicants note that while Stava discloses a short circuit welding process that includes a short condition, that Stava does not disclose or suggest the above-noted feature recited in amended claim 1 of storing a relationship between a lapse of time from a short circuit of the welding wire and the welding base material and a gradient of the welding current, the gradient being smaller than a gradient at a pulse rise of a current waveform of the pulse.

Regarding Oku, Applicants note that while Oku teaches that the voltage-current gradient of the output characteristic is varied (see col. 4, lines 1-2), that Oku does not disclose, suggest or otherwise render obvious the above-noted feature recited in amended claim 1 of storing a relationship between a lapse of time from a short circuit of the welding wire and the welding base material and a gradient of the welding current, the gradient being smaller than a gradient at a pulse rise of a current waveform of the pulse.

In view of the foregoing, Applicants respectfully submit that Stava and Oku, either alone or in combination, do not teach, suggest or otherwise render obvious the above-noted feature recited in amended claim 1. Accordingly, Applicants submit that amended claim 1 is patentable over the cited prior art, an indication of which is kindly requested.

Regarding claims 2, 3, 6 and 14-16, Applicants note that these claims depend from claim 1 and are therefore considered patentable at least by virtue of their dependency.

C. Claim 11 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Stava (US 6,501,049) or Kawai (JP 01-266966) in view of Oku (US 3,36,473).

Claim 11 depends from claim 7. Applicants submit that Oku fails to cure the deficiencies of Kawai, as discussed above, with respect to claim 7. Accordingly, Applicants submit that claim 11 is patentable at least by virtue of its dependency.

D. Claims 17-21 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Kawai (JP 01-266966) in view of Stava (US 5,001,326).

Claims 17-21 depend from claim 7. Applicants submit that Stava (US 5,001,326) fails to cure the deficiencies of Kawai, as discussed above, with respect to claim 7. Accordingly, Applicants submit that claims 17-21 are patentable at least by virtue of their dependency.

II. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may best be resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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